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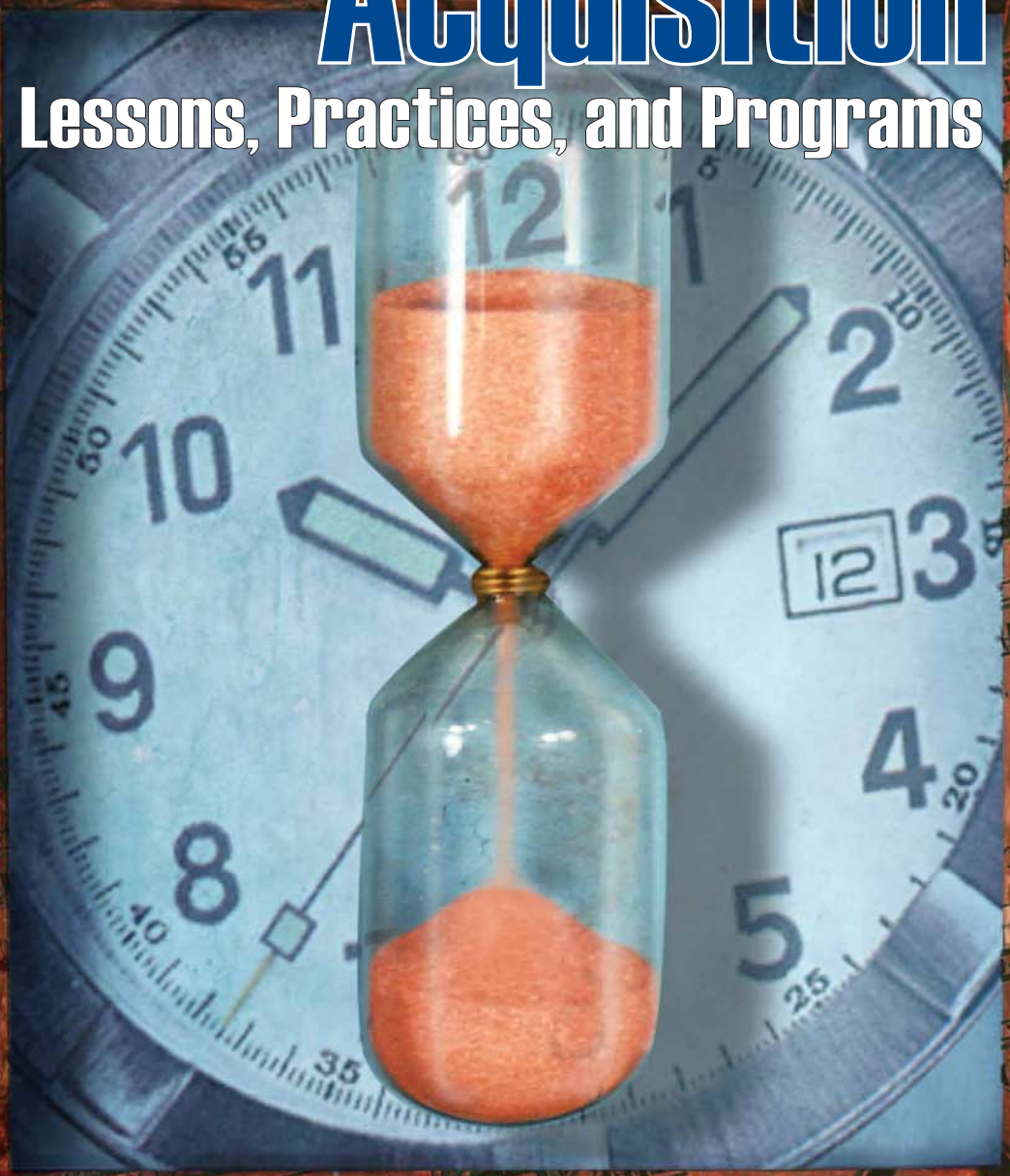
Lessons, Practices, and Programs



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Time-Based Acquisition

Programs

Major Kevin J. Schields, USAF

Time-Based and Time-Phased Requirements within CJCSI 3170.01.

Special Feature

The Secretary of Defense identified priorities, including fixes to our military acquisition system. His letter calls for a joint concept of operations (CONOPS) for integrating military assets and translating the CONOPS to an acquisition strategy. The Secretary identified a further priority of shortening the acquisition time line by 50 percent.[1] Our acquisition programs are challenged by long cycle times, which lead to high program costs, technological obsolescence, threat evolutions beyond our capabilities, and an evolution of requirements to offset new enemy capabilities. One solution is time-based and time-phased requirements. This approach calls for warfighters to define capabilities needed to conduct their assigned military missions and the acquisition corps to deliver goods to fulfill those capabilities with tailored programs. Initial or core capabilities of systems will be delivered to the warfighter with planned follow-on increments to increase a systems capability. To better do this, the warfighting commands can use time-based requirements in their mission needs statements and prioritize specific capabilities within their programs and between competing programs.

Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01 spells out a framework for defining capabilities needed by combatant commanders. The instruction calls for a top-down approach to defining capabilities rather than the current bottom-up approach.[2] The purpose is to ensure the warfighter has the equipment necessary to conduct operations for the combatant commander. The instruction also sets a standard for developing these capabilities. The Joint Capabilities Integration and Development System (JCIDS) defines tasks and procedures to ensure warfighting needs are met.

The acquisition community can apply time-based requirements and time-phased programs to its practices in two different approaches: the block upgrade approach and a capabilities-set upgrade cycle. The block upgrade approach consists of improvements to existing systems in a sequential manner, achieving capabilities in a time line set by combatant commander needs. The capabilities set combines different weapon systems to field the capability for a combatant commander. This is offset against the new capabilities-set spiral upgrade. The idea behind this approach is to combine weapon systems from all the Services synergistically to achieve greater capability than possible in one system.[3]

Time-based and time-phased requirements is an approach to defining acquisition programs based on achieving an ultimate or final capability in a series of steppingstone increments. The final goal is to bring a needed capability to the warfighter more efficiently. For a time-based and time-phased approach to be effective, all aspects of acquisition programs must use time as an entering argument. New programs must include time in requirements documents, including key performance parameters, to ensure the time to field a new or existing system upgrade is competed efficiently. This approach needs to start at the top of the requirements generation process and work its way through the defense establishment in fulfilling national military and security objectives.

Przemieniecki: Acquisition of Defense Systems

In *Defense Acquisition Systems*, J. S. Przemieniecki defines military acquisition as an extension of the national security policy process, using the military instrument of power. National security objectives and the directives that follow are derived from threat assessments and our concept of operations. We combine these to give us military options. We make strategies and establish missions from these options with the idea of achieving our military objectives. Harold McCord developed this model, discussing the national military policy and our defense acquisition process.[3]

When current military capability does not support these options, we can change our operations, training, and maintenance; modify an existing system (nonmateriel solution); or acquire a new weapon system (materiel solution). Nonmateriel solutions are looked at first since they are usually less expensive and may be able to build on existing systems.[4] Time-based requirements can be used effectively to add clarity to an existing weapon system program with the goal of giving it more capability and to achieve military objectives for the combatant commander.

Joint military operations formally started with the Goldwater-Nichols Act of 1986. This act clarified the roles and responsibilities of the Services as they support national military objectives through the Secretary of Defense. The Chairman of the Joint Chiefs of Staff was given a larger role in forming strategy and contingency planning. This role includes joint planning with combatant commanders' being consulted in the assessment of our military capability. The Chairman also advises the Secretary of Defense on priorities of requirements identification by the combatant commanders. This planning link is the basis for CJCSI 3170.01 in identifying and validating operational military requirements, the priority of those requirements, and how best to fill the need, either materiel or nonmateriel.

This requirements generation system is defined further in Air Force Instruction (AFI) 10-601, *Mission Needs and Operational Requirements Guidance and Procedures*, as being a procedure for developing mission needs and operational requirements into acquisition programs. The instruction details four specific reviews prior to major command (MAJCOM) input for materiel or nonmateriel solutions. The system is set up to plan for acquisition programs for up to 25 years in the future. A *strategy to task* process links tasks for military capabilities to military strategies. This lengthy process ensures buy in from the corporate Air Force by including a team—composed of test, logistics, environmental, safety, health, weather, and acquisition people and other MAJCOMs—to define requirements.[5] AFI 10-601 claims this method will help *streamline* the requirements-generation process and shorten acquisition cycles. However, with all the different levels of review and the fact combatant commanders have no input except to review results, it is hard to imagine this process working as advertised.

Department of Defense Directive (DoDD) 5000.1 further expands on the idea of time-based acquisition, stating, "Validated, time-phased requirements matched with projected capability need an available technology to support the development of evolutionary acquisition strategies." The document also calls for spiral development as the preferred acquisition process.[6] The purpose is to match user needs with a time-based acquisition process to provide military capability and shorten expanded acquisition cycle times. This should reduce problems with the expanded acquisition cycle times of high costs, technological obsolescence, threat evolutions beyond the capabilities being procured, and evolution of user requirements to offset new enemy capabilities. The only input from the commander who is actually fighting a war will not be made until the plan already is done. A commander would be hard pressed to fill warfighting requirements without interaction from the people who make the plans. The new guidance in CJCSI 3170.01, AFI 10-601, and DoDD 5000.1 brings clarity to mission requirements and then translates it into program requirements to reduce the time of acquisition programs.

CJCSI 3170.1 Guidance

CJCSI 3170.01 is focused on a capabilities-based methodology of effects-based acquisition operations to support the joint forces commanders by providing the capabilities and integrated forces required to accomplish assigned missions. Time is an essential component of this methodology, and the effort will focus primarily on ensuring the joint force is properly supported to perform all military operations. As the joint force becomes more integrated and interdependent, a coordinated process will define how the joint force operates and how new capabilities will be defined and developed.

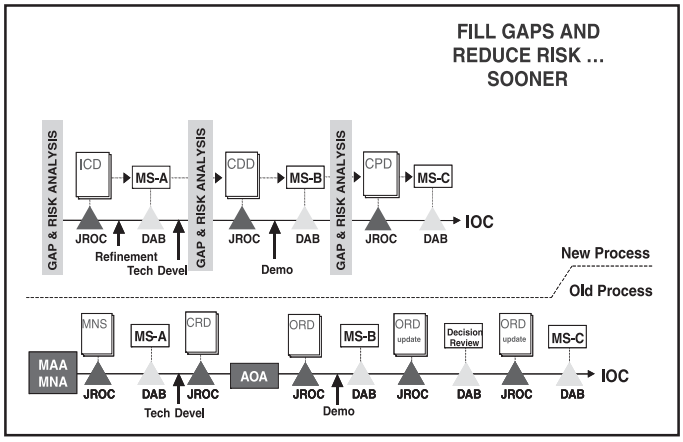

Figure 1. What's the Difference?

The major change is that combatant commanders will have a larger part in identifying deficiencies in their warfighting capabilities. These deficiencies will be translated into needs and requirements. The requirements will be integrated and developed to further military capabilities. This guidance can be changes in doctrine, organization, materiel, training and education, leadership, personnel, and facilities; in other words, the same materiel or nonmateriel solutions we currently concentrate on. The change is that the requirements will come directly from the warfighter as opposed from the Services.

CJCSI 3170.01 is focused on capabilities-based and time-based requirements. Both ideas are central to tailoring acquisition programs to streamline the process of fielding equipment to the warfighter. Capabilities-based requirements will define better what needs to be acquired, and this definition will enable our acquisition community to fill those needs with a time-based system. The change in concept is shown in Figure 1.

The old requirements generation system starts with service programs that react to threats. The new system derives its objectives from combatant commander needs. Service capabilities still will exist and contribute to the effort. They still will organize, train, and equip the forces to be employed by the combatant commander. Their expertise will be called on to fill weapon-system-specific capabilities and projected capabilities to meet the warfighters' needs. The new system in CJCSI 3170.01 deals with requirements generation and the system to translate those requirements into acquisition programs. The new system is the JCIDS.

JCIDS is a change in the way the Department of Defense will approach defining requirements for acquisition systems. The new system will focus on top-down identification of needed requirements from combatant commanders rather than the existing bottom-up requirements generation system. The requirements generation system was a series of bottom-up changes in equipment or doctrine rather than a top-down, capabilities-driven requirement. To contrast this, JCIDS translates strategic guidance into joint concepts of operation (COO). The COO is the basis for prioritizing competing demands to improve joint warfighting capabilities.

An integrated architecture is a set of weapon systems combined to achieve a capability. An example would be different command and control assets such as the Joint Surveillance Target Attack Radar System and Airborne Warning and Control System. Each performs a different task but contributes to overall capability in command and control.

Article Highlights

The warfighting commands can use time-based requirements in mission needs statements and prioritize capabilities within their programs.

Time-based and time-phased requirements is an approach to defining acquisition programs based on achieving an ultimate or final capability in a series of steppingstone increments. The goal is to bring a needed capability to the warfighter more efficiently. This approach needs to start at the top of the requirements generation process and work its way through the defense establishment in fulfilling national military and security objectives.This approach will give combatant commanders a larger part in identifying deficiences in their warfighting capabilities since the requirements will come directly from the warfighter instead of the Services. Commanders at al levels can help this process by continuing to implement this approach even after the current set of commanders moves on.

The biggest change is the fact that evolutionary acquisition ideas are implemented in the JCIDS. CJCSI 3170 states that new acquisition must field systems quickly; a partial solution is acceptable while working toward the 100-percent solution. This is time-based requirements and time-phased programming filling needs defined through COOs.

The joint COOs are based on strategic guidance that is based on our National Military Strategy architecture (National Military Strategy, Defense Strategy, National Security Strategy, QDR, and Defense Planning Guidance). The COO will serve as general guidance to joint forces commanders, outlining the manner in which the CJCS expects warfighting and peacekeeping missions to be carried out. The COOs link overarching national security policy to the joint operating and functional concepts.

Joint functional concepts integrate military capabilities required to accomplish military operations. They are broadly described in the COO and then derive specific context from the joint operating concepts. The joint operating concepts promote common attributes in sufficient detail to conduct experimentation and measure effectiveness. The combatant commander's focus is on a defined functional area but applies across the full range of military operations under review of the Functional Capabilities Board (FCB).

The FCB is a permanently established body responsible for organization, analysis, and prioritization of joint warfighting requirements within an assigned functional area. The Joint Requirements Oversight Council (JROC) will establish the number of FCBs, approve the functional areas, and determine the makeup of each FCB. The FCB is responsible for coordinating, integrating, and deconflicting the efforts of all components within the functional area. The FCB is responsible for the entire doctrine, organization, training and education, leadership personnel, and facilities (DOTMLPF) range of solutions. Each FCB will develop and maintain a prioritized list of DOTMLPF-warfighting requirements within its assigned area.[7] This body can do a lot to further evolutionary acquisition by holding the Services and program offices to time-based requirements and time-phased programs. This body, through the JROC and, hence, the Joint Chiefs of Staff has the authority to prioritize programs and ensure time lines are established, evaluated, implemented, and kept. This top-level oversight is crucial to acceptance and successful implementation of time-based and time-phased requirements. The implementation of this approach lies within three documents: the initial capabilities document (ICD), capabilities development document (CDD), and capabilities product document (CPD).

The ICD is similar to the mission needs statement of the requirements generation system. The mission needs statement details a long-term view of required missions and alternatives, both materiel and nonmateriel, to fill them. The document was developed to fill service needs. The ICD is developed to fill joint warfighting needs spelled out as capability gaps in functional areas. The ICD captures "well-framed functional analysis" previously described in CJCSI 3170 and can include time as a basis for evaluation. The mission needs statement was a long-term view of deficient capabilities. The ICD needs to address short-term as well as long-term views to be effective. Different materiel solutions will be presented and evaluated in this phase. Adding an evaluation for time to fill immediate and short-term needs will go far to fill a capabilities gap. It is another discriminator to be used in evaluating competing systems. This documents the need for a materiel solution and defines the capability gap or other deficiency as described in the applicable functional concepts and integrated architecture.[8]

The CDD is the primary means for the warfighter to provide valid (authoritative, measurable, and testable) requirements to the acquisition community for system development and demonstration. To fill a time-based approach, requirements initially can be a partial solution to full capability. Incremental upgrades or capability can and should be added to achieve the capability ultimately needed by the warfighter. The CDD captures this information via key performance parameters. Key performance parameters can be tied to a timeframe to achieve the capability and a time line for achieving full capability. The CDD is a place to put teeth into the JCIDS. Each succeeding phase of an acquisition program must address the initial capability gap. The ultimate end of full capability must be kept in mind, using the incremental approach of time-based acquisition. Each succeeding increment must be on a path to achieve and document the path to full capability. A new document does not need to be written, just an amendment to the existing plan to guide the development of the newest increment to include another time line. The CDD is similar to the operational requirements document (ORD) of the requirements generation system, but the ORD does not have an incremental approach to filling requirements that are a basic part of the CDD and time-based acquisition. The CDD can be modified easily to add new incremental capabilities.[9]

Finally, the CPD addresses production elements specific to a single increment of an acquisition program for production and fielding of a system. The CPD provides the necessary operational performance parameters in the form of key performance parameters. The key performance parameters will be only for the increment that is being produced and not necessarily for the full capability required. The CPD also will address and refine threshold and objective values for each key performance parameter. A threshold is the minimally acceptable level of performance; the objective is the desired end state. This document can assist the acquisition community if the key performance parameters, their thresholds, and objectives are all tied to a time when the capability is needed. To better achieve full capability, lessons learned from previous increments will need to be applied from all phases of the acquisition program. Requirements need to be tailored to each system to include time.[10] Figure 2 shows the difference between the new and old acquisition time line.[11]

The bottom line is that CJCSI 3170.01 sets the stage for capabilities-based acquisition, starting with the needs of combatant commanders' filling their roles in national military strategy. This capabilities-based system is the first step in time-based requirements and time-phased programs. The authority for the programs comes from the JCIDS process within the structure of the JCS. To fully realize the capability of time-based programs, the acquisition community must integrate time into its key performance parameters, requirements documents, CPDs, ICDs, CDDs, and threshold and objective requirements. The user owes validated, time-based requirements to the acquisition community. The job of the warfighter does not end with the publication of time-based requirements; the warfighter also needs to be responsive to the acquisition community to publish additions

to CDDs, with increments defined, when a new opportunity presents itself. This is a key difference to link JCIDS to a time-based acquisition program successfully.

Time-Based Requirements in Acquisition Programs

Time-based acquisition begins with a living requirements document, including validated, time-based requirements from the warfighter. Acquisition program managers then take those requirements and build their programs around them to overcome the capabilities shortfall. The different weapon system programs will work together to synergistically fill capabilities. The basic flow is described in Figure 3 as the COOs lead to architecture sets of capabilities and then to specific systems to achieve capabilities to fill shortfalls for the combatant commander.[12]

This methodology takes capabilities shortfalls and groups them with systems to overcome those shortfalls. Each system is evaluated based on how well it achieves its objectives and in what timeframe. Redundant programs can be targeted for elimination if they fail to fill a needed capability or fail to fill it in time. A joint approach like this takes into account programs from all the Services. The time-based objectives can be described in the immediate, near, and long term. Immediate needs can be filled in a similar manner to current combat mission needs statements (CMNS). A CMNS is a time-constrained method of filling capabilities to specific programs. AFI 10-601 covers this topic in more detail, and while it is beyond the scope of this article, the capability exists and can be used for immediate needs of the warfighter.

Near-term programs, taking up to 5 years, and long-term programs of 20 years or more can be planned in a more conventional manner. An initial or core capability of a system can be described and programs set up to fill the core need with a requirements document stating the validated requirement, to include a timeframe. Each succeeding increment will have new, validated, time-based requirements to expand the core capability. The MAJCOM staffs will need to work with the acquisition community to describe what capabilities will be included in the core capability and what capability will be added in each successive increment and when the increment will be in place. This also will require coordination with the combatant commander's staff to fill capabilities gaps in a time-based manner. All parties will need to work together to define the full capability each specific weapon system can fill. Further gaps in combatant commander requirements will need to be filled through other programs if the 100-percent solution of a specific weapon system is not able to fill combatant commander needs completely. The plan to deliver the new increment will be similar to the core with respect to a requirements document. An amendment to the requirements document should be produced, stating the added capability and the timeframe for completion. This approach is an existing spiral but has an effects-based and time-phased program to bring capability to the combatant commander. The core system is the initial capability shown in Figure 4.

The core is the capability needed now or in the near future. MAJCOMs, working with combatant commander staffs, will define further needs and the time line for acquiring those capabilities. Rather than a continuous upgrade of a weapon system, the warfighter will accept each incremental capability and the time line for producing it. This approach is set for a synergistic program, like the previously discussed command-and-control example, to bridge gaps in a single weapon system.[13]

The effects-based spiral approach starts with capabilities sets and combines the capabilities of existing and planned systems to fill gaps at specified times. The existing approach uses block upgrades added in serial to expand the capability of an existing weapon system. The F-16 is an example with its block 5, 10, 20, and 30 upgrades added one after the other to the fleet to bring the aircraft a more complete conventional capability to the combatant commander.[14]

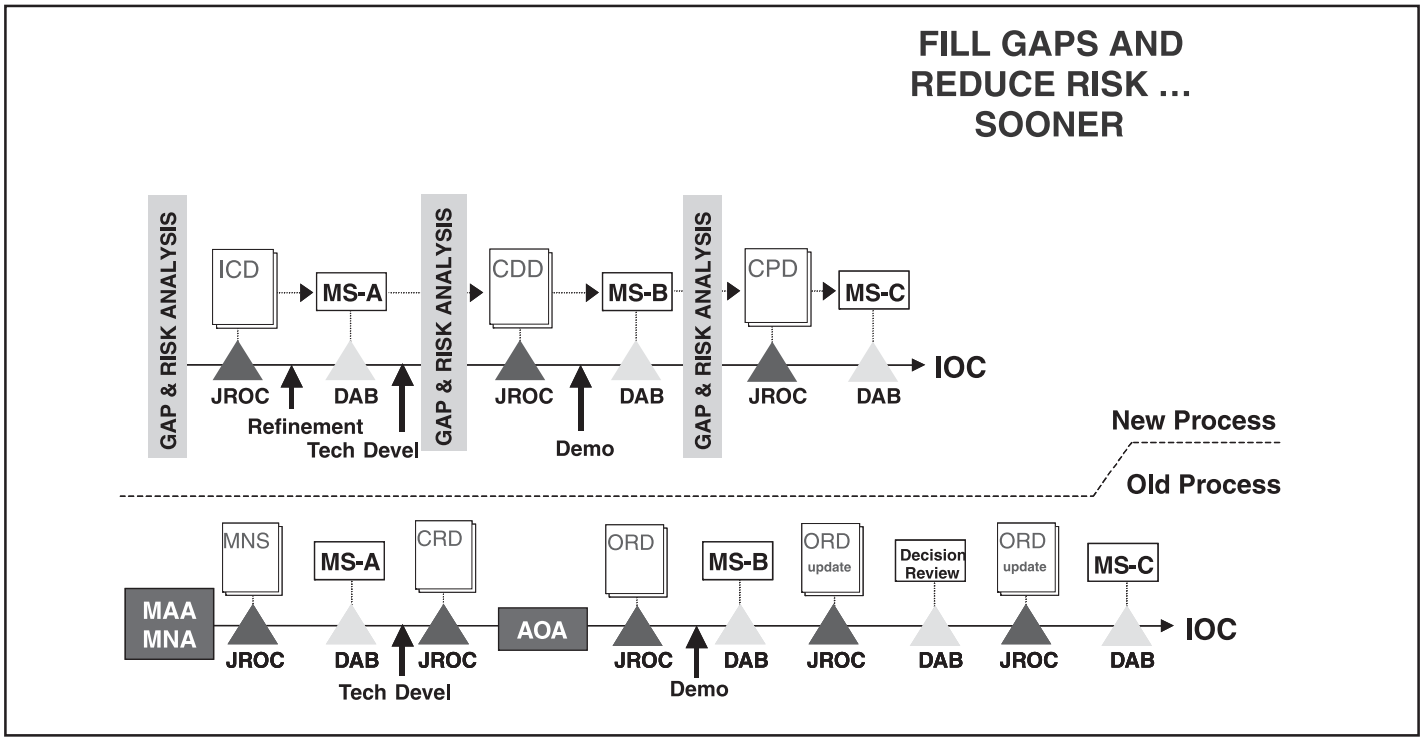

Figure 2. Joint Capabilities Integration and Development

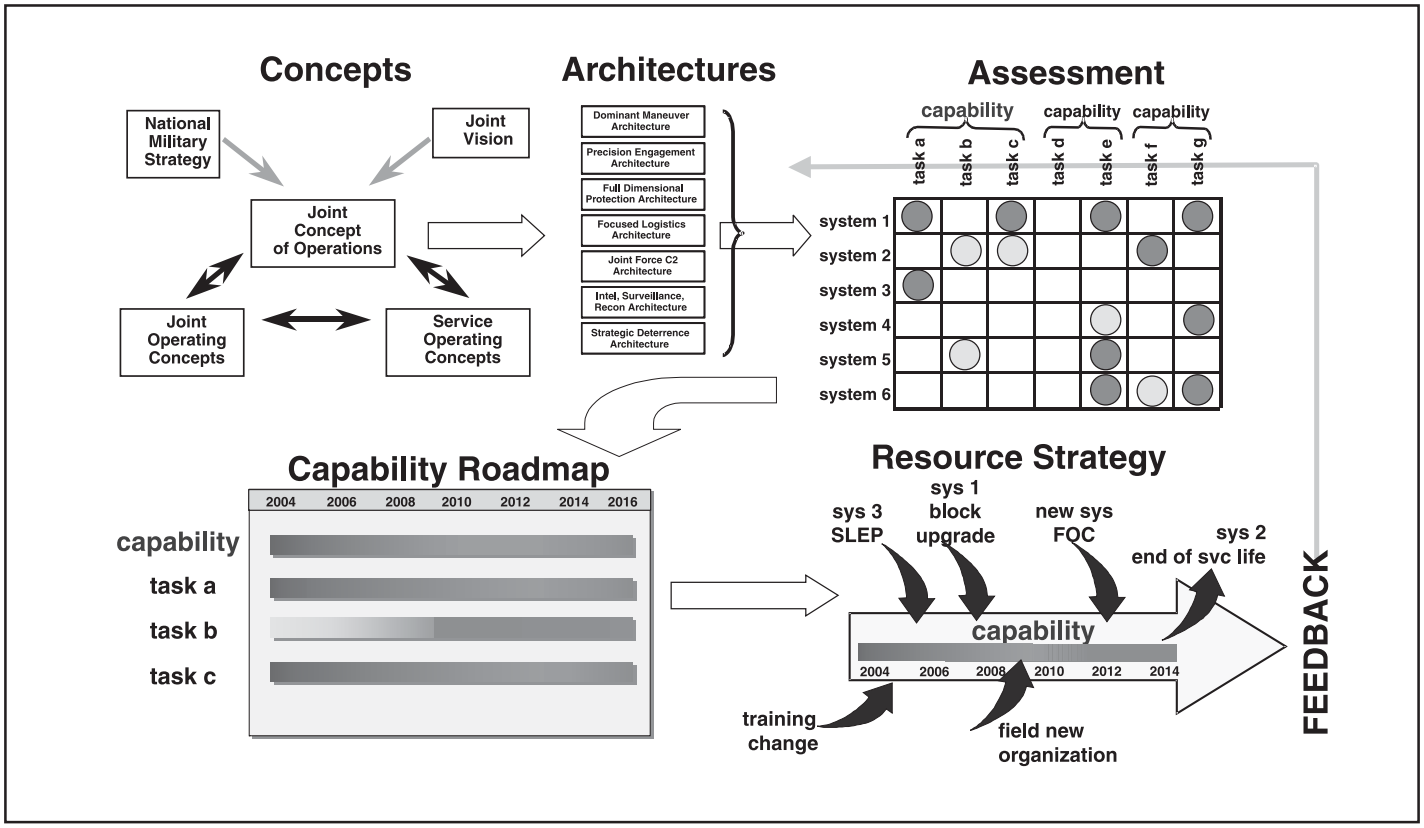

Figure 3. Proposed Methodology

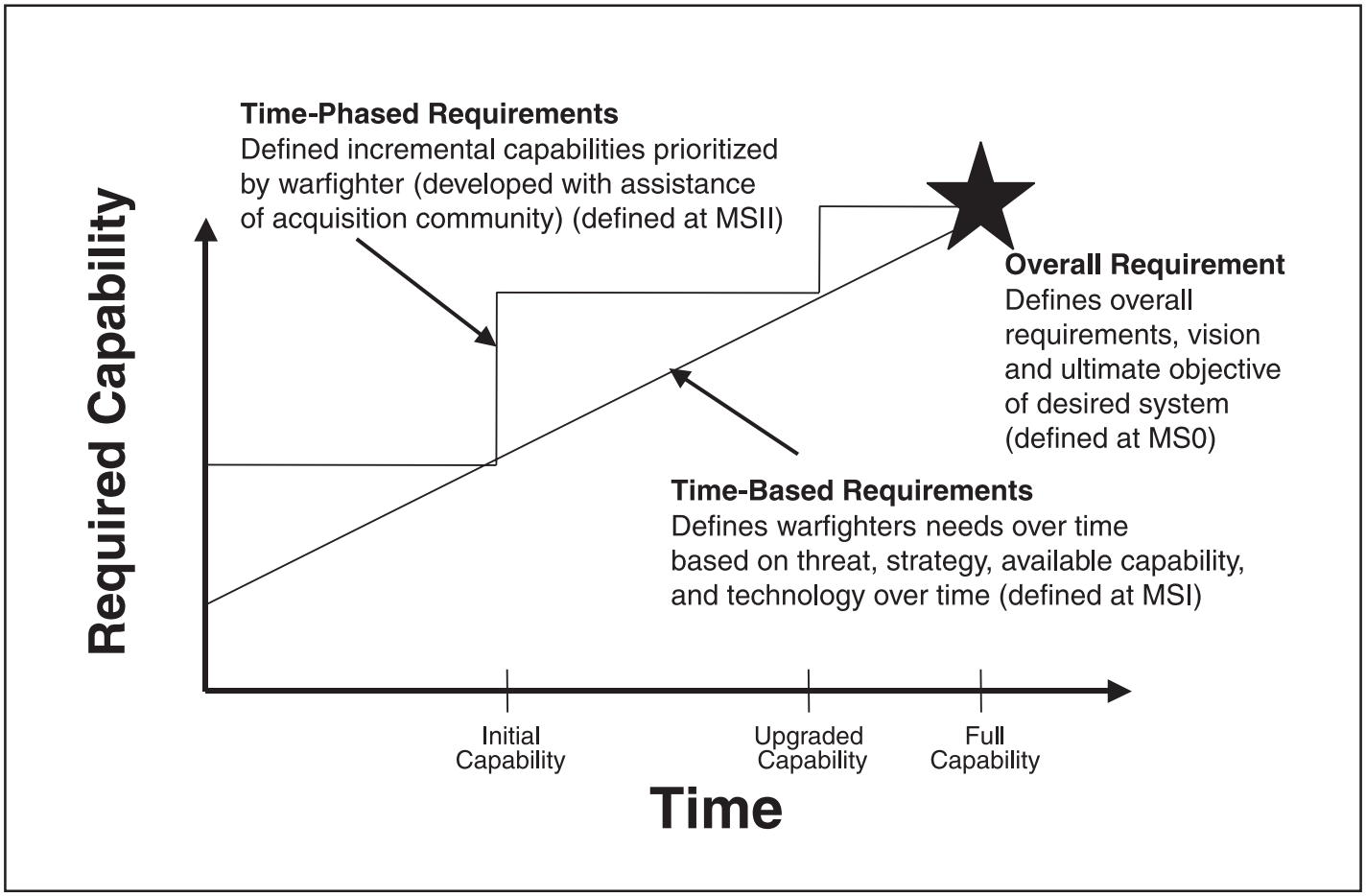

Figure 4. Time-Phased and Time-Based Requirements

The effects-based spiral approach builds on the capabilities of multiple weapon systems to fill a need in an overarching set like command and control. For example, JSTARS and AWACS currently fill our command-and-control requirements. They will have new block upgrades added to them over time to increase their utility to combatant commanders. The next step involves adding new systems to the command and control area with spaced-based radar and MC2A. These systems will have requirements documents that describe the capability to be filled and the timeframe to complete the core program. Each program can have increments added, as described above, to continue to fill gaps in capability. Each upgrade to an existing system adds to the capabilities of the set.

Recommendations

Finally, there are *tasks* to be accomplished by the actors in military acquisition for time-based acquisition to work its best. First, the Office of the Secretary of Defense and the Joint Staff, to include J-8, and JROC will need to put teeth into the time and capabilities-based acquisition initiative. Formative and directive policies will need to be written and enforced to get all the actors working together. This is not to say there will not be conflicts or differences, but the conflict cannot be about buying into the time-and-capabilities-based acquisition system. They also will need to be prepared to cancel programs early if they fail to meet combatant commander needs. Programs canceled early, obviously, cost less in time and money.[15] Basing programs on time, as well as capability, gives commanders a more complete picture of the potential of a specific system. Combining this with a capabilities set of weapon systems will give military and civilian leaders a better idea of the effect of canceling projects that may build on each other, like our command-and-control example above.

Second, the Services will need to buy into the system. Each service probably will arrive at its solution in similar but distinct ways. It is not imperative for the Services to have the same path, only that they achieve the results of a time-and-capabilities-based requirements and acquisition system to fill the needs of combatant commanders. The service staffs also will need to work closely with combatant commander staffs to fully understand capabilities gaps and the time lines required to fill those gaps. Finally, the Services will need to work with the acquisition staffs and program offices to produce requirements documents to include setting time lines to be used for production of upgrade programs.

Third, MAJCOM staffs will need to work with their service and probably other services to identify potential materiel and nonmateriel solutions to capabilities gaps. They also will need to work with the acquisition community in publishing a requirements document, including time-based requirements and time-phased programs. Potential problems include being an advocate of a specific weapon system, as opposed to filling a combatant commander need.

Fourth, the combatant commanders and their staffs need to review the work of the above actors in the time-based acquisition process. Specifically, they need to ensure the time-based work meets their capabilities shortfalls. They will need to work with the JROC staff to approve acquisition programs meeting their gaps in capability. Operational plans will need to be scrubbed for obsolete or outdated information to make sure they are passing on the most correct information to the acquisition community.

Finally, the program offices will need to work with MAJCOM and service staffs in producing requirements documents and designing their programs to focus on time-based requirements and time-phased programs. Clear communication with MAJCOM, service, and joint staffs on program shortfalls will allow staffs to make recommendations to commanders based on prestated priorities and how they will affect a capabilities set of programs. Program offices also need to conduct detailed analysis on time, its costs, and its benefits. Cost of delay and time-tracking methodology are two tools available. Cost-of-delay analysis can shed light on the value of time and performance tradeoffs. This analysis draws comparisons between the value of time and the costs involved with production or development delays. This analysis will enable acquisition program managers to make more informed decisions using combatant commander priorities and the above value analysis. Scheduling and time-tracking tools can be based on user needs and costs associated with program delays. This will lead to a more informed decision to deliver capability to the warfighter.

Mostly, what the acquisition community needs to do is stand up and say there is a cost associated with the time it takes to complete programs. Cost-of-delay analysis and scheduling software will help track and identify schedules and the cost of time. Time is what we can gain from a more efficient acquisition program. And time is, after all, the only unrenewable resource available.

Are these good ideas for the acquisition community in speeding up the cycle time? Yes. We have been organizing and training to fight as a joint force since the 1986 passage of the Goldwater-Nichols Act and for good reason. Our fight today will be a joint action, combining air, land, sea, and spacepower to fill combatant commander needs in the application of military power. If we train and organize as a joint force, it follows we can and probably should equip ourselves as a joint force. CJCSI 3170.01 is a good first step on the path of a more responsive acquisition system. Combatant commanders request forces based on capabilities; they should request needed capabilities in the same manner. This is a good idea, but there are challenges to implementing this program.

The challenges include skepticism from the military community.[16] Is this just another pet program that will change with new commanders? Only time will tell if capabilities-and time-based acquisition continues. Commanders at all levels can help this process by continuing to implement this approach even after the current set of commanders moves on. Second, stable funding will be a challenge for this approach. If we continue to partially fund programs, we will continue to lengthen programs and have similar problems. If we can overcome these challenges, we can give combatant commanders the capabilities they need in a useful time line. If not, it may be just business as usual.

Conclusion

The military acquisition program is challenged by long cycle times. This long acquisition time line can lead to high program costs, technological obsolescence, threat evolutions beyond our capabilities being procured, and an evolution of requirements

to offset new enemy capabilities. A time-based program is one solution to combat these problems. A time-based program is tailored to deliver a core capability to the warfighter in the near term and then add incremental capabilities in a time line defined by combatant commanders and their needs.

CJCSI 3170.01 spells out a top-down, capabilities-based framework for defining capabilities. The instruction also sets a standard for developing these capabilities. The Joint Capabilities Integration and Development System defines tasks and procedures to ensure warfighting needs are met.

The acquisition community can apply time-based requirements and time-phased programs in either a block upgrade approach or a capabilities-set upgrade cycle. Both systems deliver capability to the warfighter. The block upgrade approach is an existing system to add capability, one weapon system at a time. The capabilities-set approach combines weapon systems to achieve a capability for the combatant commander and then upgrades systems to capitalize on the synergy created by many assets, working together to achieve effects for the warfighter.

Time-based and time-phased programs apply the framework of CJCSI 3170 to bring capability to the warfighter more quickly. All actors in the acquisition process must participate fully in the system for it to be effective. New programs must include time in requirements documents, key performance parameters, and threshold and objective requirements to ensure the time to field a new or existing system upgrade is competed efficiently. This approach needs to start at the top of our requirements generation process and work its way through the defense establishment to assist in fulfilling our national military and security objectives.

Notes

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Contacting the Journal Staff

We've relocated to temporary facilities at Maxwell AFB, Alabama, while our permanent home is undergoing rennovation. Planning is for a return to the Gunter Annex address in late 2004. Our temporary address and phone numbers are listed below.

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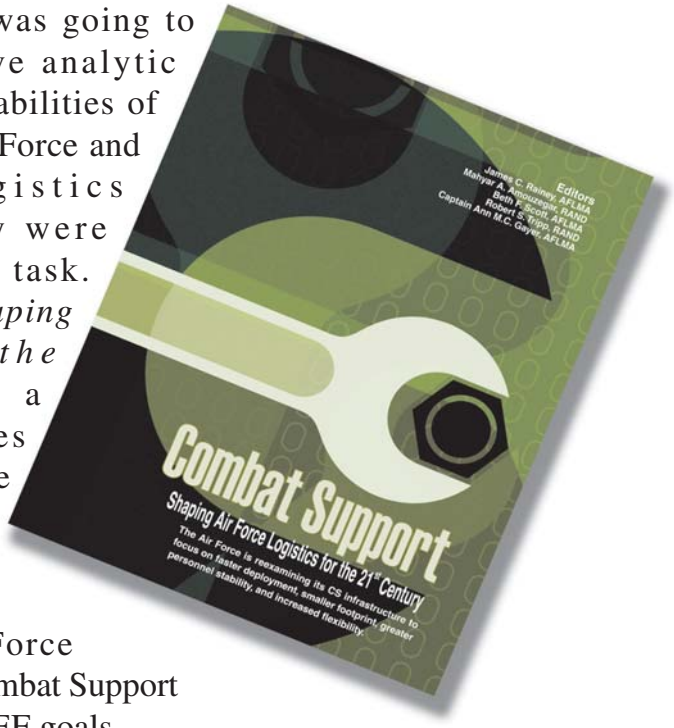
In 1996, shortly after Operation Desert Strike, concern about the long-term requirements of enforcing the no-fly zones, including covering *the carrier gap,* led to the initial concept of an air and space expeditionary force. At that time, the Deputy Chief of Staff, Operations, Lieutenant General John P. Jumper, realized that transforming the Air Force to a more expeditionary footing was going to require comprehensive analytic study. The unique capabilities of both RAND Project Air Force and the Air Force Logistics Management Agency were harnessed to take on this task. *Combat Support: Shaping Air Force Logistics for the 21st Century* is a compilation of articles that communicates the essentials of the analyses completed over the last 6 years. The research was conducted to help the Air Force configure the Agile Combat Support system in order to meet AEF goals.



The Editorial Advisory Board selected "German Wonder Weapons: Degraded Production and Effectiveness"—written by Major Todd J. Schollars—as the most significant article to appear in Vol XXVII, No 3 of the *Air Force Journal of Logistics*.